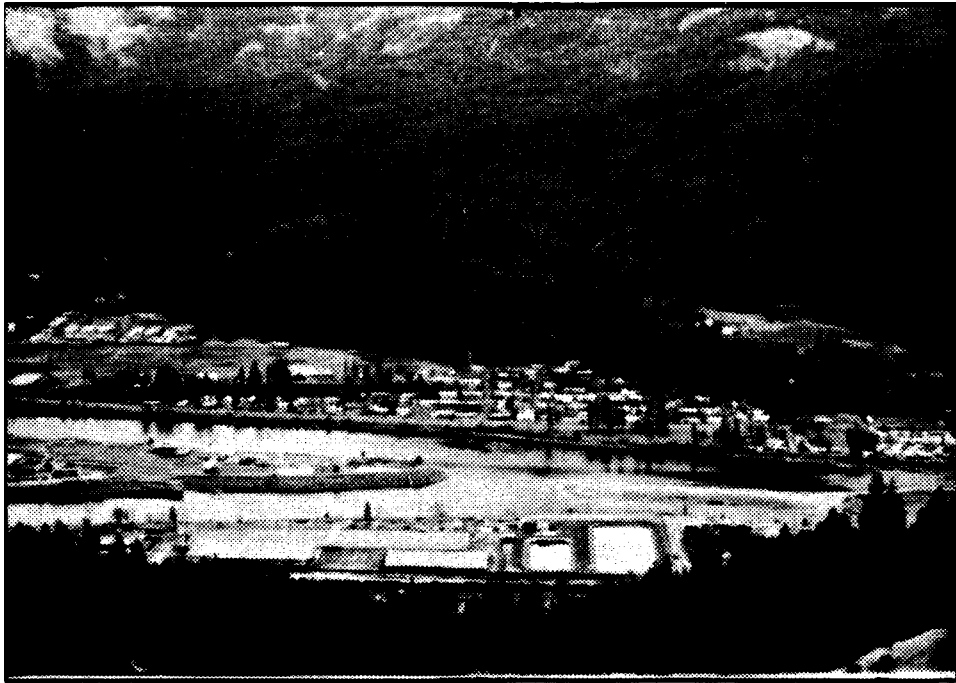




CLEARWATER FISH HATCHERY

1989 Brood Year Report



by

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ABSTRACT

Clearwater Fish Hatchery and its satellite facilities is the last fish hatchery complex to be constructed under the Lower Snake River Fish and Wildlife Compensation Plan (LSRCP). The main hatchery is still under construction while the satellites, Red River, Crooked River, and Powell, were in full operation for the rearing of 1989 brood year chinook. In 1989, Red River trapped a total of 104 spring chinook salmon. From these fish, 153,836 green eggs were taken. An eye-up of 85.9% left 131,836 eyed eggs. There were 154 adult chinook trapped at Powell, and all were released above the weir to spawn naturally. Crooked River was under construction so no fish were trapped. A total of 928,600 fish were ponded at the satellite rearing ponds from Red River, Rapid River, Dworshak, and Kooskia hatcheries.

Juveniles were fed a regular diet of OMP IV adjusted on a bi-weekly basis. On October 17 and 23, a total of 920,000 presmolts were released at the rearing sites.

There were no disease problems with the brood year 1989 production fish, and overall survival from ponding to release was 99%.

The production of 920,000 presmolts from ponding to release used 38,100 pounds of feed for a conversion of 1.33 pounds of feed per pound of fish.

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INTRODUCTION

The Clearwater Fish Hatchery complex consists of a main facility still under construction and three satellite facilities: Red River, Crooked River, and Powell. Clearwater Hatchery is the last hatchery to be built under the Lower Snake River Fish and Wildlife Compensation Plan (LSRCP). The LSRCP was developed to compensate Idaho, Oregon, and Washington for fish and wildlife losses caused by hydroelectric projects on the lower Snake and Columbia rivers. Clearwater Fish Hatchery and its satellite traps fulfill only part of the requirements.

Funding for construction of the Clearwater Fish Hatchery complex is provided by the U.S. Army Corps of Engineers. Operational funds are provided by the U.S. Fish and Wildlife Service (USFWS) on an annual basis. Revenue generated from the four lower Snake River hydroelectric dams is used to reimburse the USFWS for annual operation funds.

LOCATION

The main Clearwater Fish Hatchery facility is located in Ahsahka, Idaho approximately four miles west of Orofino, Idaho. The hatchery is located directly across the North Fork Clearwater River from Dworshak National Fish Hatchery (DNFH) and approximately one mile below Dworshak Dam.

The Red River facility is located at Red River Ranger Station approximately 65 miles east of Grangeville, Idaho in the South Fork Clearwater River drainage. The rearing facility and trap are 100 yards below the confluence of the North and South Forks of Red River.

The Crooked River facility is also in the South Fork Clearwater River drainage located approximately 45 miles east of Grangeville, Idaho. The adult trapping facility and support cabin are located one quarter mile upstream from the mouth of Crooked River. The rearing ponds are located 10 miles upstream from the mouth of Crooked River and the feed/storage building is 11 miles upstream from the mouth of Crooked River.

The Powell facility is located in the Middle Fork Clearwater River drainage where Whitesands and Crooked Fork form the Lochsa River. This facility is approximately 98 miles east of Kamiah, Idaho near the Idaho-Montana border.

OBJECTIVES

The objectives of the Clearwater Fish Hatchery complex are:

1. To return 12,000 spring chinook salmon Oncorhynchus tshawytscha above Lower Granite Dam.
2. To trap and spawn adult spring chinook broodstock returning to Red River, Crooked River, and Powell.

CWATER89/89BYRPT

3. To rear up to a total of 1.5 million spring chinook to presmolt and fall release at the satellites. This includes a maximum of 300,000 at Red River, 700,000 at Crooked River, and 500,000 at Powell.
4. To rear a total of up to 2.4 million steelhead smolts at the main facility for release into the upper Clearwater River drainage.
5. To evaluate rearing capacities and operational procedures of Clearwater Fish Hatchery and its satellites.

STAFFING

The Clearwater Fish Hatchery complex is currently staffed by three permanent employees; a manager (Hatchery Superintendent III), an assistant manager (Hatchery Superintendent I), and a roving fish culturist. Seasonal staff includes five 8-month and two 3-month temporary employees to operate the satellite facilities. When Clearwater Fish Hatchery comes on line in 1991, one additional assistant manager, two fish culturists, and one utility craftsman will be added to the permanent employee staff.

SITE DESCRIPTION

Red River

Red River fish facility consists of an adult trapping and holding area, a newly constructed rearing pond, a support cabin, and two outbuildings. A tripod weir and panel system is used to block passage of migrating adults and deflect them into the ladder and trap. The holding area consists of two 40 ft x 10 ft x 7 ft concrete ponds with a total capacity of 500 adults. A sprayer system is used to provide shade and lessen jumping.

The juvenile rearing area is a 165 ft x 65 ft x 5.5 ft earthen pond with a rearing capacity of 300,000 fish. This pond is lined with a poly liner to form a pathogen barrier between the fish and the bottom. All water to the trap and rearing area is gravity flow from an intake in the South Fork of Red River.

The support cabin is a self-sustaining unit complete with cooking and living area, a sleeping area, and private and visitor restroom areas. A small shop is attached to the cabin to provide some tool storage. In addition, there are two outbuildings. One consists of a shop and storage unit and the other houses a walk-in feed freezer, with a capacity of 10,000 pounds and provides some storage. There is also a 12 ft x 14 ft wall tent to provide additional housing for spawning and work crews.

Crooked River

Crooked River fish facility is broken into three separate areas. An adult trap and support cabin is located one-quarter mile upstream from the mouth of Crooked River. Migrating adults are diverted by a bridge and panel weir system into the fish ladder and trap. All trap water is gravity flow from an intake structure located approximately 200 yards upstream. The support cabin has full cooking, sleeping, and both private and visitor restroom facilities. A small shop is attached to the cabin to store tools and equipment.

Approximately 10 miles upstream are two 165 ft x 20 ft x 4 ft concrete rearing ponds. Three Nielsen automatic feeders are suspended from the wall of each pond. A built-in vacuum system discharges solid waste into a primary settling area then into a settling pond. Effluent flows directly into the settling pond then back into Crooked River. The rearing area is fed by gravity flow from an intake 150 yards upstream. Maximum flow is approximately 9 cubic feet per second (cfs) to be split between both ponds. Water temperatures may reach 68°F in late summer.

An equipment and food storage building is located one mile upstream from the rearing ponds. A walk-in freezer with a capacity of 15,000 pounds is located in this building. Pond cleaning equipment and some tools are stored in this building.

Security has been a problem at the rearing facility in the first year of operation. Two acts of vandalism were reported though neither had an impact on fish production.

Powell

Powell fish facility consists of a juvenile rearing pond, adult trapping and holding facility, and a support cabin and shop. The juvenile rearing area is a 165 ft x 65 ft x 4 ft earthen pond with a poly liner to form a pathogen barrier between the fish and the bottom. Pea gravel lines the bottom and river cobble lines the side slopes. A concrete center walkway supports eight Nielsen automatic feeders set to feed once every hour throughout the day. Two large roller screens are at the outflow and are used to keep debris from plugging water flow. An intake structure located on Walton Creek provides gravity flow water to a distribution box then on to the rearing pond and adult facility. Maximum water flow is approximately 7 cfs.

The adult trapping and holding facility consists of a floating weir system across the Lochsa River. Migrating adult chinook salmon that challenge the weir are diverted into Walton Creek to another weir 20 yards upstream, then into the ladder and trap. A series of resting pools were constructed in Walton Creek in cooperation with the Powell Ranger District. Two 100 ft x 12 ft x 8 ft adult holding ponds along with a covered spawning area are available to hold adults and spawn on site.

The support cabin and shop are used to house employees and perform needed repairs. A walk-in feed freezer with a 14,000-pound capacity is also inside the shop area. Living quarters include a kitchen and living room area, sleeping quarters and both private and visitor restrooms. In addition to the cabin a 12 ft x 14 ft wall tent is available as additional housing for large work crews.

ADULT TRAPPING

Red River

The weir and trap were put into operation on June 8, 1989. Trapping operations were shut down on September 4, 1989. During that period a total of 104 fish entered the trap (Figure 1). This included 5 jacks, 50 adult males and 49 adult females (Appendix 1 and Appendix 2). Fork lengths were taken on all fish returning to the weir, and age breakdowns were made based on length data (Figure 2) (Appendix 3). All ponded fish were injected with Erythromycin phosphate at a rate of .5 cc per 10 pounds of body weight.

Spawning operations began on August 8, 1989 and concluded on September 5, 1989. A total of nine spawning days took an estimated green egg count of 153,411. Thirty-one females were spawned producing a fecundity of 4,949 eggs per female (Table 1). All eggs taken were water-hardened in a 200 ppm solution of active iodine for one hour before being transported to Kooskia National Fish Hatchery for incubation to eye-up stage. Spawned carcasses had been treated with formalin and were disposed of in a sanitary landfill (Appendix 4).

There were 3 jacks, 30 adult males, and 35 adult females ponded; of these, 4 females and 10 males died for a pre-spawning mortality of 20.5%. All ponded fish were treated with 100 ppm formalin solution three times per week to control fungus Saprolegnia spp. When sorting and spawning operations began, treatments were increased to four times per week. Twenty disease samples were taken at spawning time and all 20 samples tested negative for IHN and IPN. Six samples tested positive for BKD and three tested positive for Ceratomyxa shasta.

All snouts from adipose-clipped adults were removed and sent to the Lewiston Lab for recovery of a coded wire tag (CWT) (Table 2).

Crooked River

The Crooked River facility was under construction during the 1989 trapping season, thus no adults were trapped. Crooked River production fish from the 1989 brood year consisted of DNFH and Rapid River Hatchery stock transported to the rearing pond in June 1990.

RED RIVER RUN TIMING

BROOD YEAR 1989

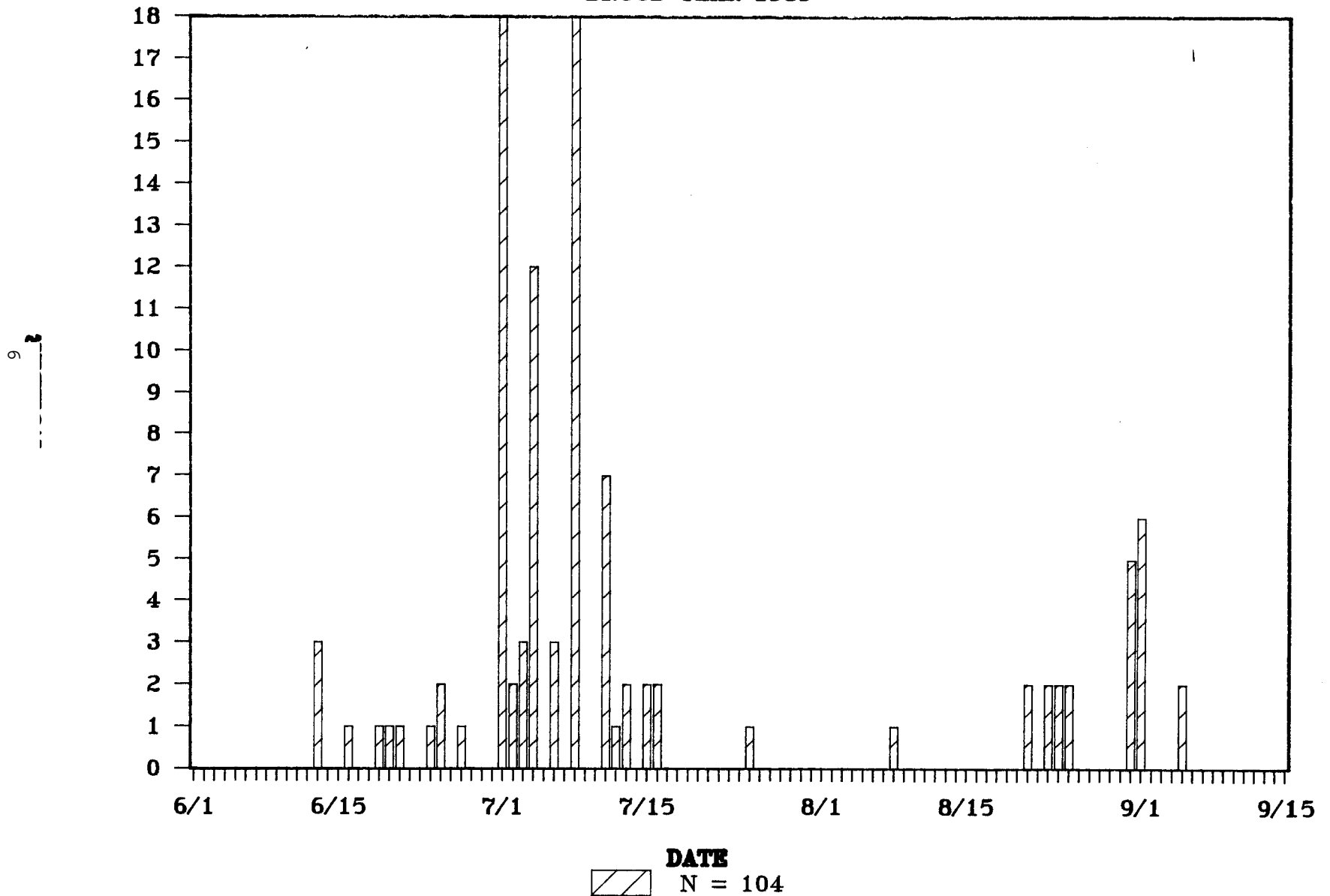


Figure 1. Spring chinook salmon run timing at Red River, brood year 1989.

RED RIVER LENGTH FREQUENCY

BROOD YEAR 1989

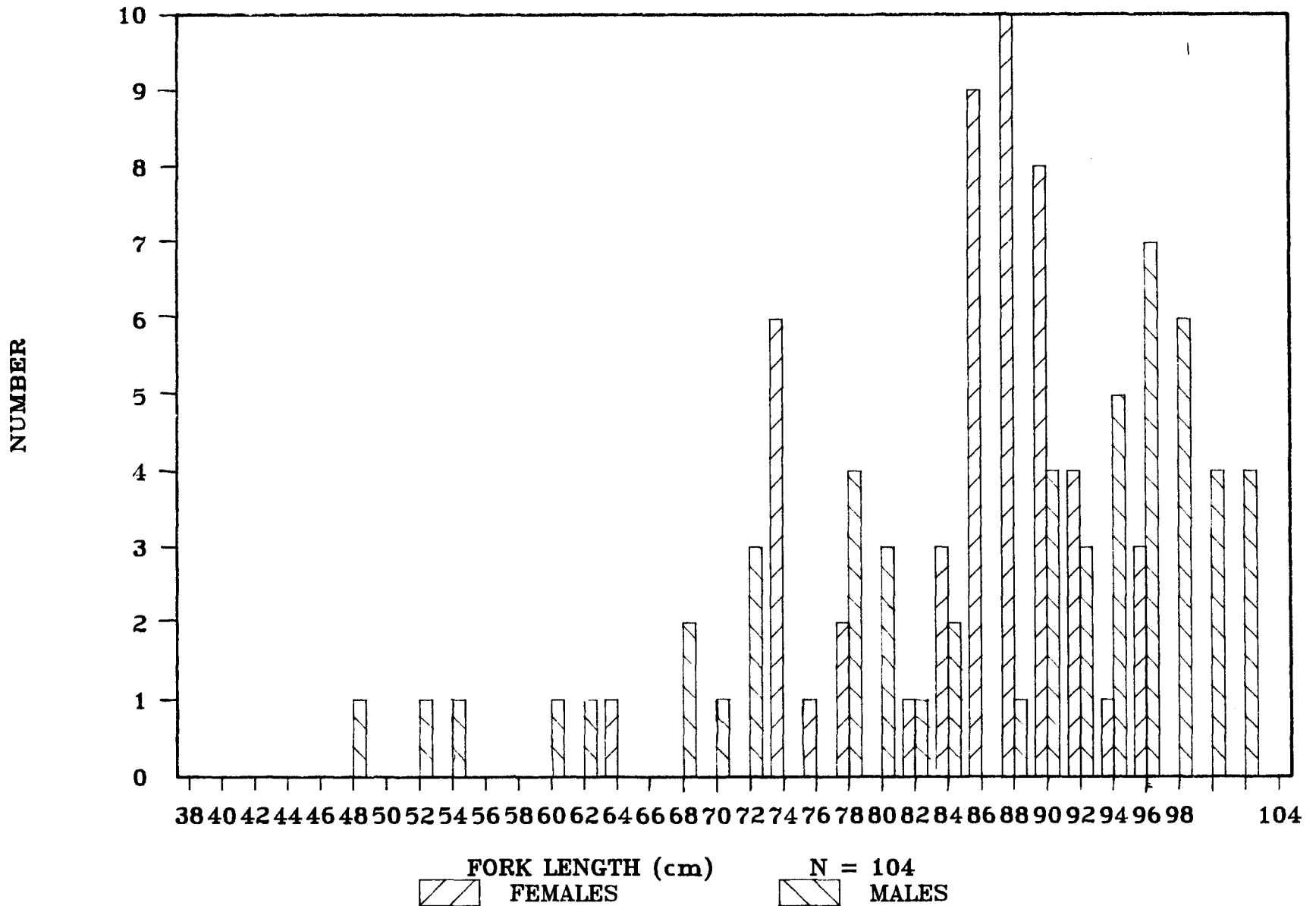


Figure 2. Spring chinook salmon adult length frequency at Red River, brood year 1989.

Table 1. Red River spring chinook salmon spawning summary, brood year 1989.

Take	Date	Number Females	Eggs/ Female	Green Eggs	Eyed Eggs	Eye- Up(%)
1	8/08	2	4,742	9,483	4,413	46.5
2	8/09	2	4,742	9,483	4,413	46.5
3	8/15	4	5,889	23,556	20,592	87.4
4	8/18	2	4,858	9,716	9,500	97.8
5	8/22	10	4,779	47,790	43,500	91.0
6	8/24	1	4,355	4,355	4,020	92.3
7	8/29	6	4,864	29,186	28,250	96.8
8	9/01	2	5,216	10,432	9,268	88.8
9	9/05	2	4,705	9,410	7,880	83.7
Totals		31	4,949	153,411	131,836	85.9

Table 2. Coded Wire Tag adult returns to Red River, 1989.

Year Trapped	Sex	Fork Length (mm)	Tag Code	Spawn Date
1989	M	762	23-18-63	8/15/89

Powell

Trapping operations began on July 6, 1989 and were shut down on September 11, 1989. During this time, a total of 154 adult chinook salmon were trapped (Figure 3). This number included 44 females, 83 adult males, and 27 jacks (Appendix 1). A temporary box trap was used during the initial trapping as construction of the permanent trap was not complete. On July 19, the permanent trap was put into operation and began trapping fish immediately. Prior to August 23, 26 fish entered the trap. At this time, a decision was made to release all trapped fish to spawn naturally. Between August 23 and September 11, 128 fish were trapped. Length data was collected from these fish and they were released to spawn naturally (Figure 4) (Appendix 3). As a result, no adults were spawned at Powell in 1989.

Production fish from the 1989 brood year consisted of stock from Dworshak and Kooskia National Fish hatcheries. These fish were transported to the rearing pond in June 1990.

EARLY REARING

Red River

Initial egg incubation was done by Kooskia Hatchery; final incubation and early rearing was done by Dworshak National Fish Hatchery. This practice will continue until construction of Clearwater Fish Hatchery is completed. Incubation and eye-up data, along with handling practices and procedures, was not available.

Crooked River

Egg incubation and early rearing were done by DNFH and Rapid River Hatchery. DNFH will continue to early rear juveniles until the Clearwater Fish Hatchery is constructed and operational. Rapid River Hatchery provided supplemental stock due to inadequate fish numbers from DNFH and Kooskia Hatchery. Incubation and eye-up data are not available on these fish as they came from partial lots.

Powell

Egg incubation and early rearing were done by Kooskia and DNFH. DNFH will continue to early rear juveniles until Clearwater Fish Hatchery is constructed and operational. Incubation and eye-up data are not available for Powell production fish as they came from partial lots.

POWELL RUN TIMING

BROOD YEAR 1989

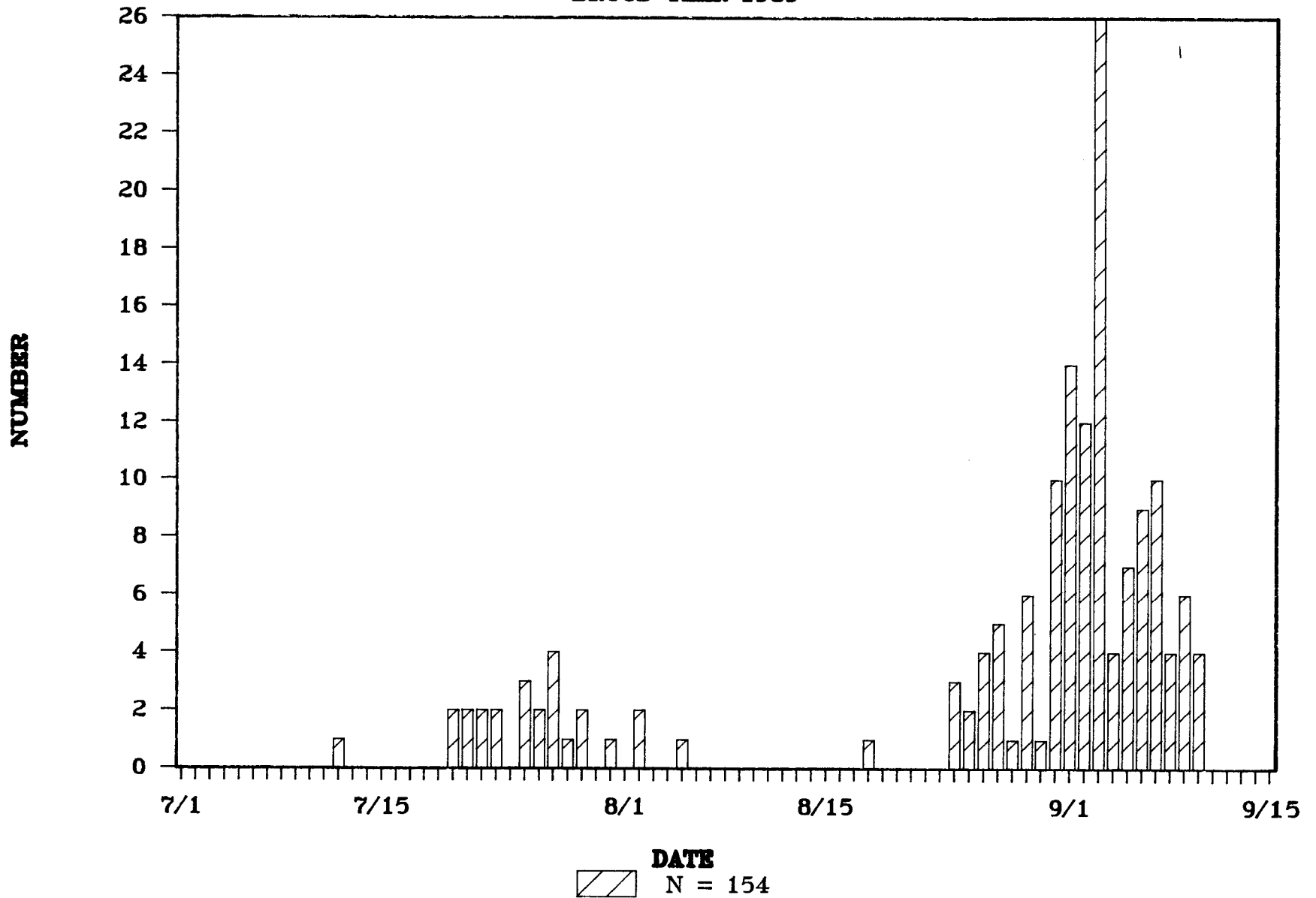


Figure 3. Spring chinook salmon run timing at Powell, brood year 1989.

POWELL LENGTH FREQUENCY

BROOD YEAR 1989

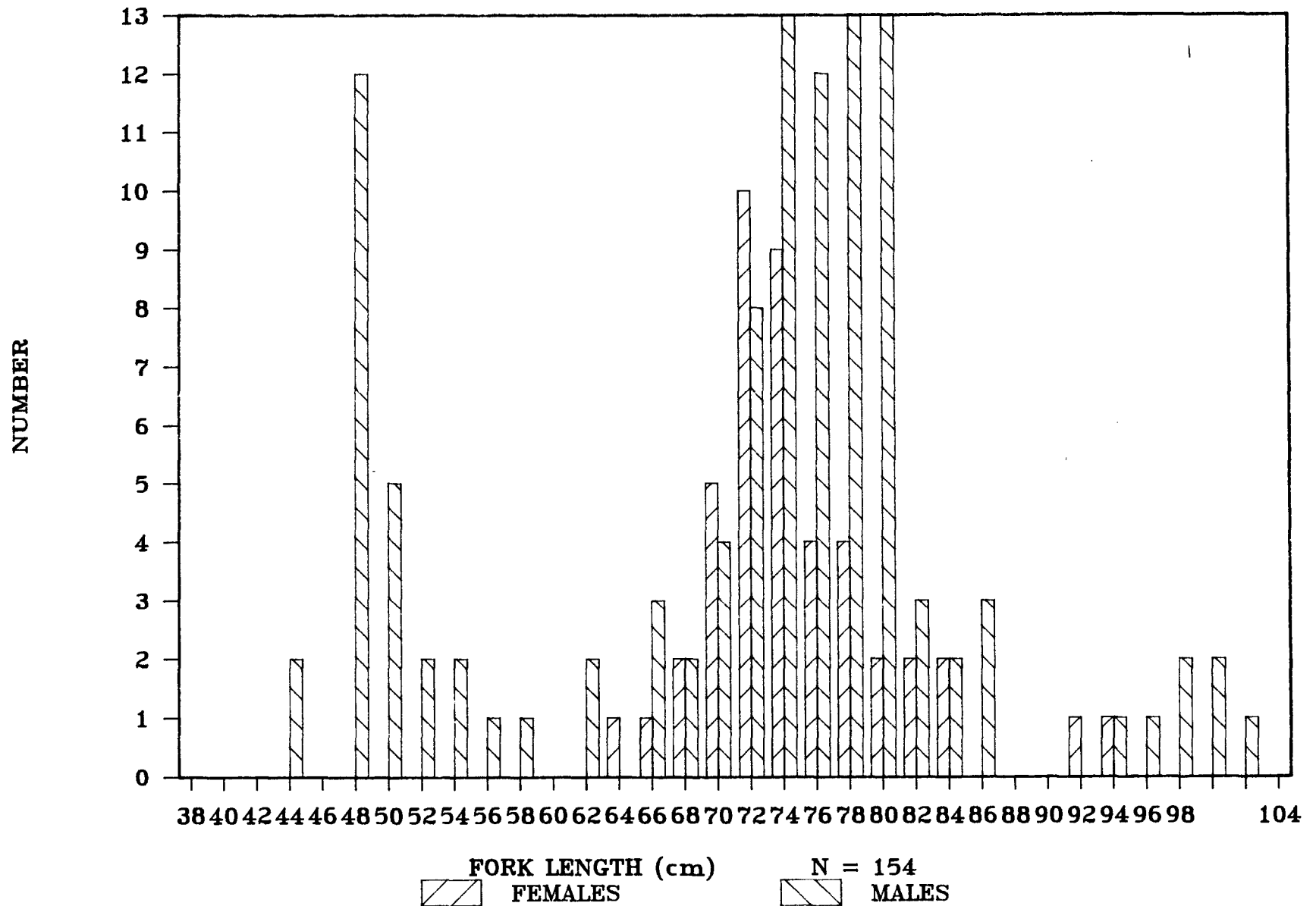


Figure 4. Spring chinook salmon adult length frequency at Powell, brood year 1989.

FINAL REARING

Red River

On June 5 and 6, 1990, a total of 276,778 fish averaging 89.7 fish/lb were transported to Crooked River for part of the final rearing process. The Red River pond was being redesigned to reduce a disease treatment problem, and Crooked River had sufficient rearing space to accommodate additional fish. These fish consisted of 105,682 Red River stock that were early reared at DNFH and 171,096 Kooskia Hatchery stock. All fish were confirmed negative for IHN at the time of ponding (Table 3).

Immediately after ponding, the fish were put on a diet of Erythromycin in the form of Gallomycin GM-50 at a rate of 41 g/100 lbs of fish for 21 days. Subsequent diet consisted of OMP IV, a moist pelleted feed produced by Moore-Clark Company. A second Erythromycin feeding was administered in August prior to marking and release. Feed was placed in three Nielsen automatic feeders set to feed once every hour throughout the day.

Length frequency and pound count data were collected at the first and middle of each month. This data was used to adjust feeding rates and determine length-weight relationships; i.e., condition factor. The fish were also monitored for general health. Mortalities were removed and counted each day and checked for any obvious abnormalities. The pond was cleaned on a 10-day basis until the latter part of final rearing then weekly. A vacuum system operated by a 3-inch Wacker trash pump discharged solid waste into a primary settlement area. On October 10, 1990, the fish were moved from Crooked River to Red River to take up residence in the newly-constructed rearing pond. The time was also useful in acclimating the fish to the Red River water source. Idaho Department of Fish and Game (IDFG) adult tankers were used to transport the fish with minimal mortality.

Once fish were ponded at Red River, feeding had to be done by hand since the automatic feeders and walkway system had not yet been installed.

Crooked River

On June 5 and 7, a total of 342,338 juvenile fish averaging 173.6 fish/lb were transported to Crooked River for final rearing. Dworshak Hatchery provided 131,129 of these fish which were confirmed positive for IHN at the time of ponding. Rapid River stock composed the remaining 211,109 fish, which were negative for IHN (Table 3). A large size variation was observed between the Dworshak and Rapid River hatcheries fish and feeding practices, especially feed size, and had to be adjusted to compensate.

Immediately after ponding, these fish were put on a diet of Erythromycin in the form of Gallomycin GM-50 at a rate of 41 g/100 lbs of fish for 21 days. Subsequent diet consisted of OMP IV. A second Erythromycin feeding was

Table 3. Release summary of juvenile chinook salmon, brood year 1989.

Location	Release Date	Release Number	Number/ Pound	Disease
Red R.	10/23/90	273,800	27.9	None
Crooked R.	10/17/90	339,100	32.9	IHN +
Powell	10/23/90	307,100	25.4	INN +

administered in August prior to marking and release. Feed size and feeding rates were adjusted according to bi-weekly sample count data. Feed was placed in three Nielsen automatic feeders set to feed every hour throughout the day.

Length frequency and pound count data was collected on day 1 and 15 of each month. This data was used to determine length-weight relationships or condition factor. Fish were also monitored for general health at that time. Mortalities were removed and counted each day and checked for any obvious abnormalities. The pond was cleaned on a 10-day basis during the early part of final rearing and weekly during the latter part using a vacuum system operated by a 3-inch Wacker trash pump. Waste was discharged directly into a primary settlement area.

Powell

On June 4 and 6, a total of 309,533 juveniles averaging 127.3 fish/lb were transported to Powell for final rearing. These fish were composed of 247,093 Dworshak stock, of which 126,447 were confirmed positive for IHN, and 62,440 Kooskia stock confirmed negative for IHN (Table 3).

Immediately after ponding, these fish were placed on a diet of Erythromycin in the form of Gallomycin GM-50 at a rate of 41 g/100 lbs of fish for 21 days. Subsequent diet consisted of OMP IV. A second feeding of Erythromycin was administered in August prior to marking and release. Feed was placed in eight Nielsen automatic feeders set to feed every hour throughout the day. Sample count data was collected on day 1 and 15 of every month and was used to determine length-weight relationships and adjust feeding rates. Fish were also monitored for general health at that time. Mortalities were removed from the tail screens on a daily basis, counted, and examined for any obvious abnormalities.

Pond cleaning was not feasible during the rearing cycle because of the size and construction of the pond. Pea gravel lines the pond bottom to a depth of 8-10 inches and is impossible to clean when the pond is full.

FISH MARKING

Red River

The IDFG marking crew marked a total of 64,673 Red River fish with a coded-wire tag (CWT). An additional 800 fish were marked with a Passively Integrated Transponder (PIT) tag. All CWT and PIT tagging on Red River fish was done during the period October 1, 1990 to October 5, 1990 at the Crooked River raceway. Coded-wire Tag included 21,395 fish coded 10/43/04, 22,015 fish coded 10/43/05, and 21,263 fish coded 10/43/06 (Table 4). All fish were returned to the rearing area and monitored for mortality. A total of 242 CWT mortalities were recorded for a tagged fish survival of 99.7%.

Table 4. Marking summary of juvenile chinook salmon, brood year 1989.

Location	Number Marked	Mark Type	Mark Code	Release Group	Release Date
Red River	21,395	CWT	10-43-04	273,800	10/23/90
Red River	22,015	CWT	10-43-05	273,800	10/23/90
Red River	21,263	CWT	10-43-06	273,800	10/23/90
Red River	800	PIT	*	273,800	10/23/90
Crooked River	21,891	CWT	10-43-07	339,100	10/17/90
Crooked River	22,400	CWT	10-43-08	339,100	10/17/90
Crooked River	21,884	CWT	10-43-09	339,100	10/17/90
Crooked River	800	PIT	*	339,100	10/17/90
Powell	21,837	CWT	10-43-01	307,100	10/23/90
Powell	22,436	CWT	10-43-02	307,100	10/23/90
Powell	20,649	CWT	10-43-03	307,100	10/23/90
Powell	800	PIT	*	307,100	10/23/90

* PIT tagged fish are numbered in consecutive order. These number codes are available from Rodney Duke, IDFG Lewiston, Idaho.

Crooked River

A total of 66,175 Crooked River fish were marked with CWT. An additional 800 fish were PIT tagged. Marking occurred from October 8, 1990 to October 12, 1990. Coded-wire Tagging included 21,891 fish coded 10/43/07, 22,400 fish coded 10/43/08, and 21,844 fish coded 10/43/09 (Table 4). All fish were returned to the rearing area and monitored for mortality. A total of 45 CWT mortalities were recorded for a tagged fish survival of 99.9%.

Powell

A total of 64,922 Powell fish were marked with CWT. An additional 800 fish were PIT tagged. Marking occurred from September 24, 1990 to September 28, 1990. Coded-wire Tagging included 21,837 fish coded 10/43/01, 22,436 fish coded 10/43/02, and 20,649 fish coded 10/43/03 (Table 4). All marked fish were released directly into Walton Creek to begin their migration. The size of the rearing pond is not conducive to holding marked fish and unmarked fish separate to avoid double handling. Therefore, an accurate assessment of tagged fish survival was not possible.

FISH RELEASE

Red River

On October 23, 1990, 273,800 presmolts averaging 27.9 fish/lb were released directly into Red River. These fish represented a 98.9% survival from initial ponding at Crooked River to release from Red River. Fish were released over a period of four hours by opening a sluice gate at the outflow end of the rearing pond. Minor complications arose due to water seeping under the pond liner. Provisions are being made to correct this problem by next year.

Crooked River

On October 17, 1990, 339,100 presmolts averaging 32.9 fish/lb were released directly into Crooked River. These fish represented a 99% survival from initial ponding to release. The fish were released over a period of two hours by removing dam boards from the outflow end of the rearing pond and opening a sluice gate. The October 17 release date was necessitated by slush ice blocking screens at the inflow of the pond. A surge of juvenile chinook was encountered at a smolt monitoring trap at the Crooked River adult facility within 24 hours after release of the presmolts.

After release, the rearing pond was cleaned with the use of a pressure washer. All of the concrete bottom and side walls, as well as the screens, were washed to remove any remaining organic matter. Next, a solution of 200 ppm chlorine was applied and left over winter.

Powell

On October 23, 1990, 307,100 presmolts averaging 25.4 fish/lb were released directly into Walton Creek. The fish represented a 99.8% survival rate from initial ponding to release. The fish were released over a period of one hour by removing dam boards at the outflow end of the rearing pond. The fish took advantage of resting pools constructed in Walton Creek and remained there for as long as a week.

After release, the rearing pond was cleaned and sterilized with chlorine. Trash pumps and pressure washers were used to clean the river cobble, pea gravel and concrete structures. When all organic material was removed the entire rearing pond was sprayed with a 200 ppm chlorine solution and left over winter.

FISH HEALTH

Red River

Twenty samples from spawned adults were tested for BKD, IHN, IPN, and Ceratomyxa shasta. All twenty samples were negative for IHN and IPN. However, six samples (30%) tested positive for BKD as determined by the Fluorescent Antibody Test (FAT), and three samples (15%) tested positive for Ceratomyxa shasta.

There were no disease problems encountered during the rearing of brood year 1989 juveniles at Crooked River or after their transfer to Red River. IDFG Eagle Pathology Lab personnel made routine on-site examinations of the juveniles. During these visits, nothing unusual was discovered.

Crooked River

Since production fish for Crooked River were provided by Dworshak and Rapid River hatcheries, we were unable to test broodstock for diseases. However, 131,129 Dworshak stock were confirmed positive for IHN at the time of ponding. Routine examinations of the juveniles by IDFG Eagle Pathology Lab personnel showed no abnormalities, and all disease samples tested negative throughout the final rearing period.

Powell

Since production fish for Powell were provided by Dworshak and Kooskia hatcheries, we were unable to test broodstock for diseases. However, 126,447 juveniles transported from Dworshak were confirmed positive for IHN at the time of ponding. During routine examinations by IDFG Eagle Pathology Lab personnel, no apparent signs of IHN or negative effects were discovered. Diseases samples of the juveniles tested negative throughout the final rearing period, and no obvious abnormalities were noticed.

A P P E N D I C E S

Appendix 1. Spring chinook salmon adult trapping and age summary
at Red River and Powell, brood year 1989.

Location	Red River	Powell
Jacks (< 64 cm)	5	27
4-year Females (64-82 cm)	11	40
4-year Males (64-82 cm)	14	71
5-year Females (> 82 cm)	38	4
5-year Males (> 82 cm)	36	12
Total trapped	104	154

Appendix 2. Correlation of released smolts and adult returns to Red River weir and trap.

Brood year	Release date	Release number	Returns			Total	Percent return
			3-year-old	4-year-old	5-year-old		
1982	83 fall 84 spr	260,000 40,000	2	*	107	n/a	n/a
1983	85 apr ¹	80,000	*	377	259	636	.795
1984	86 apr'	136,800	35	132	74	241	.176
1985	86 fall 87 spr	96,400 ² 98,800 ²	3	25	**		
1986	87 fall	233,100	5	**	**		
1987	88 fall	291,200	**	**	**		
1988	89 fall	240,500	**	**	**		
1989	1990	273,800	**	**	**		

* Trap was not installed in 1986 due to construction.

** These fish have not returned yet.

¹ These fish over wintered in the rearing pond.

² These fish were Rapid River stock reared at Sawtooth and released directly into Red River with no acclimation.

Appendix 3. Spring chinook salmon adult length-frequency data at Red River and Powell, brood year 1989.

Length (cm)	Red River		Powell	
	Males	Females	Males	Females
38	0	0	0	0
40	0	0	0	0
42	0	0	0	0
44	0	0	2	0
46	0	0	0	0
48	0	0	12	0
50	0	0	5	0
52	0	0	2	0
54	0	0	2	0
56	0	0	1	0
58	0	0	1	0
60	0	0	0	0
62	0	0	2	0
64	1	0	0	1
66	0	0	3	1
68	0	0	2	2
70	0	0	4	5
72	0	0	8	10
74	6	0	13	9
76	1	0	12	4
78	2	0	13	4
80	0	0	13	2
82	1	0	3	2
84	3	0	2	2
86	9	0	3	0
88	10	0	0	0
90	8	0	0	0
92	4	0	0	1
94	1	0	1	1
96	3	0	1	0
98	0	0	2	0
100	0	0	2	0
102	0	0	1	0
104	0	0	0	0
Totals	55	49	110	44

Appendix 4. Summary of fish disposition at Red River, brood
year 1989.

Disposition	Males		Jacks	Females
Spawned	31	*	-	31
Released	20		2	14
Mortality	10	**	0	4
Total	53		2	49

* Spawned number includes fish used more than once.

** Includes 7 fish also spawned.

*** A total of 68 fish which included 35 females and 33 males
were disposed of by Walco Sanitation Company. The
remaining fish were released.

Submitted by:

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Hatchery Superintendent I

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME


Steven M. Huffaker, Chief
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